

24



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,887	03/07/2002	George R. Brandes	ATMI-172-CIP-DIV	2808

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ATMI, INC.  
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EXAMINER

WILSON, SCOTT R

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 12/18/2002

5

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/092,887

Applicant(s)

BRANDES ET AL.

Examiner

Scott R. Wilson

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 16-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 24-45 is/are rejected.
- 7) ☒ Claim(s) 16-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 4.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

## DETAILED ACTION

### *Drawings*

This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 38 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe the formation of an amorphous silicon carbide sensor which is operable up to 1000°C.

Claim 39 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe the formation of a high temperature sensor assembly comprising an amorphous silicon carbide sensing element and electrical circuitry coupled to the element which is itself comprised of doped amorphous silicon carbide and which is operable up to 1000°C.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 43-45 are rejected under 35 U.S.C. 102(a) as being anticipated by Kortright et al.. As to claim 1, Kortright et al., discloses in paragraph three of the Introduction, an article comprising an amorphous silicon carbide film on a substrate transmissive to light, embodied as a figured glass substrate.

As to claims 43 and 44, Kortright et al. discloses that the article is formed by magnetron sputtering, which is also known in the art to be synonymous with reactive magnetron sputtering, and reactive sputtering. For example, see Wahab et al., Abstract.

As to claim 45, the amorphous silicon carbide coating of Kortright et al. has high reflectivity in the extreme ultraviolet (EUV) region, and may therefore be considered to be a protective coating, which would block the transmission of EUV radiation.

Claims 34-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Pankove. Pankove discloses (Abstract) a layer of amorphous silicon carbide formed on a photovoltaic device, which may be considered to be a light sensor.

As to claims 35, 36 and 37, Pankove discloses (col. 2, line 54) that the amorphous silicon carbide film is 0.5  $\mu\text{m}$  thick.

Claim 38 is rejected under 35 U.S.C. 102(a) as being anticipated by Nagai et al.. Nagai et al. discloses an amorphous silicon carbide film embodied as a thermistor which is operable up to 350°C (page 359, line 3), which is within the scope of being operable up to 1000°C.

Claim 39 is rejected under 35 U.S.C. 102(b) as being anticipated by Truher et al.. Truher et al. discloses a device which may comprise a doped amorphous silicon carbide sensor which is operable up to 730°C (col. 2, lines 64-66 and col. 3, line 2), which is within the scope of being operable up to 1000°C.

Claim 42 is rejected under 35 U.S.C. 102(b) as being anticipated by Loboda et al.. Loboda et al. discloses (Abstract) a VLSI electronic circuit which includes a thin film of amorphous silicon carbide formed between an active circuit structure, which can be metal, and a metalization layer, which acts as a diffusion barrier between said layers.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24 to 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bang in view of Rohm and Haas. As to claim 24, Bang discloses prior art comprising a shield of a thin film encapsulating an integrated circuit wafer chip and connection lines, which provides shielding against electromagnetic interference (col. 2, lines 10-14). Bang does not disclose expressly said thin film comprising amorphous silicon carbide. Rohm and Haas discloses an

Art Unit: 2826

electrically conductive thin film of amorphous silicon carbide (CVD Silicon Carbide®) which may be formed on a generic structure. At the time of invention, it would have been obvious to a person of ordinary skill in the art to form a thin film of amorphous silicon carbide on a prior art device referred to in Bang. The motivation for doing so would have been to prevent corrosion, as noted in applicants discussion of prior art on page 3 of the specification, or to better protect against wear or corrosion (CVD Silicon Carbide® data sheet), as well as to conduct incident electromagnetic fields to ground. Therefore, it would have been obvious to combine Rohm and Haas with Bang to obtain the invention as specified in claim 24.

As to claim 25, the low resistivity grade silicon carbide of Rohm and Haas would offer sufficient conductivity to conduct electromagnetic currents to ground, but retain optical transparency.

As to claim 26, Rohm and Haas discloses in the plot of resistivity versus temperature, that the electrical resistivity around 500°C is in the range of 0.01  $\Omega\text{cm}$  to 0.025  $\Omega\text{cm}$ .

As to claim 27, the product of Rohm and Haas, CVD Silicon Carbide®, is deposited by chemical vapor deposition.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bang in view of Rohm and Haas and further in view of Wahab et al.. Bang in view of Rohm and Haas discloses the invention of claim 24, as described above. Bang in view of Rohm and Haas does not disclose expressly said thin film formed by sputtering. Wahab et al. discloses silicon carbide thin films formed by reactive magnetron sputtering at about 850°C. At the time of invention, it would have been obvious to a person of ordinary skill in the art to form a thin film of amorphous silicon carbide on a prior art device referred to in Bang by reactive magnetron sputtering. The

Art Unit: 2826

motivation for doing so would have been to provide an even lower conductivity film, since at 850°C, the conductivity is closer to the range of from 0.01  $\Omega\text{cm}$  to 0.025  $\Omega\text{cm}$  (Rohm and Haas plot of resistivity versus temperature). Therefore, it would have been obvious to form the device of Rohm and Haas and Bang by the sputtering method of Wahab et al. to obtain the device of claim 28.

Claims 29, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bang in view of Rohm and Haas and further in view of Pankove. Bang in view of Rohm and Haas discloses the invention of claim 24, as described above. Bang in view of Rohm and Haas does not disclose expressly the thickness of the silicon carbide film. Pankove discloses a device comprising an amorphous silicon carbide film formed on an amorphous silicon substrate, which is 0.5  $\mu\text{m}$  thick. At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the thin film of Bang in view of Rohm and Haas to be about 0.5  $\mu\text{m}$  thick. The motivation for doing so would have been to form a device with the desired conductivity and optical transparency as well as thickness compatible with known manufacturing techniques, such as those disclosed by Pankove. Therefore, it would have been obvious to form the device of Rohm and Haas and Bang with the thickness disclosed by Pankove to form the devices of claims 29, 30 and 31.

Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bang in view of Rohm and Haas and further in view of Meyers et al.. As to claim 32, Bang in view of Rohm and Haas discloses the invention of claim 24, as described above. Bang in view of Rohm and Haas does not disclose expressly a "glue layer" between the structure and the thin film. Meyers et al. discloses a silicon dioxide layer formed between a metal or glass substrate and a

Art Unit: 2826

silicon carbide layer in order to provide adhesion (col. 4, lines 31-34). At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the thin film of Bang in view of Rohm and Haas with the adhesive layer of Meyers et al.. The motivation for doing so would have been to provide a mechanically durable thin film layer. Therefore, it would have been obvious to form the device of Rohm and Haas and Bang with the adhesive layer of Meyers et al. to form the device of claim 32.

As to claim 33, the adhesive layer of Meyers et al. is comprised of silicon dioxide.

Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable Zappe et al.. As to claim 40, Zappe et al., Figure 1, discloses a high-temperature pressure sensor comprising a substrate including a reference cavity region formed from a UNIBOND SOI wafer on a silicon substrate, and a low resistivity amorphous silicon carbide thin film deposited over the reference cavity, whereby changes in resistivity of the low resistivity amorphous silicon carbide thin film incident to changes in strain in the low resistivity amorphous silicon carbide thin film are sensed by a resistance-sensing circuit. At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the cavity entirely from high resistivity amorphous silicon carbide. The motivation for doing so would have been to increase rigidity, thereby enabling the measurement of higher pressures and to more effectively bond the low resistivity amorphous silicon carbide with a similar material.

As to claim 41, Zappe et al., in the Abstract, discloses doping of the silicon carbide layer by methane gas,  $\text{NH}_4$ .

***Double Patenting***



Aft Unit: 2826

Applicant is advised that should claims 38-45 be found allowable, claims 16-23 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott R. Wilson whose telephone number is 703-308-6557. The examiner can normally be reached on M-F 8:30 - 4:30 Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 703-308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

srw  
December 12, 2002

  
NATHAN J. FLYNN  
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